



Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

**Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97**

Recognized by the Federal Communications Commission

Anechoic chamber registration no.: 90462 (FCC)

Anechoic chamber registration no.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

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Test report no. : 1-0623-01-03/08_A_3

**Type identification : i.roc, RFx11_125 kHz,
RFx11_134 kHz, RFx10_13_56 MHz.**

Applicant : Ecom engineering GmbH

**FCC ID : XAM003500000, XAM0027590000,
XAM0027390000, XAM0027670000.**

**IC Certification No : 8311A-0035000000, 8311A-0027590000,
8311A-0027390000, 8311A-0027670000.**

**Test standards : 47 CFR Part 15
RSS – 210 Issue 7**

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2009-11-30

Meheza Kpelou Walla



Date

Name

Signature

Technical responsibility for area of testing:

2009-11-30

Stefan Bös



Date

Name

Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10

66117 Saarbrücken

Germany

Phone: + 49 681 5 98 - 0

Fax: + 49 681 5 98 - 9075

e-mail: info@ICT.cetecom.de

Internet: http://www.cetecom-ict.de

State of accreditation: The test laboratory (area of testing) is accredited according to
DIN EN ISO/IEC 17025
DAR registration number: DAT-P-176/94-D1

Accredited by: Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name :
Street :
Town :
Country :
Phone :
Fax :

1.3 Details of applicant

Name:	Ecom engineering GmbH
Street:	Industriestr. 2
Town:	97959 Assamstadt
Country:	Germany
Telephone:	+49(0)6294 / 4224-0
Fax:	+49(0)6294 / 4224-611
Contact:	Martin Haaf
E-mail:	martin.haaf@ecom-ex.com
Telephone:	+49(0)6294 / 4224-650

1.4 Application details

Date of receipt of order:	2008-09-15
Date of receipt of test item:	2008-10-27
Date of start test:	2009-11-26
Date of end test:	2009-11-30
Persons(s) who have been present during the test:	Mr. Sailer Mr. Fiederlein

2 Test standard/s

47 CFR Part 15	2007-09	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radio communication Devices (All Frequency Bands): Category I Equipment

3 Technical tests

3.1 Details of manufacturer

Name:	Ecom engineering GmbH
Street:	Industriestr. 2
Town:	97959 Assamstadt
Country:	Germany

3.1.1 Test item

Kind of test item :	Industrial PDA
Type identification :	i.roc, RFx11_125 kHz, RFx11_134 kHz, RFx10_13_56 MHz.
S/N serial number :	3566-PMMC-0004 3566-PMMC-0005 3566-PMMC-0007 3566-PMMC-0008
HW hardware status :	-/-
SW software status :	-/-
Frequency Band [MHz] :	ISM 2.400 - 2.483,5
Type of Modulation :	DSSS
Number of channels :	11
Antenna :	Integrated antenna
Power Supply :	115 V AC
Temperature Range :	-20 °C to +55 °C

Max. average power radiated: 12.58 dBm (DSSS)

Max. power conducted: not performed!

FCC ID: XAM003500000, XAM0027590000, XAM0027390000, XAM0027670000.

IC: 8311A-003500000, 8311A-0027590000, 8311A-0027390000, 8311A-0027670000.

3.1.2 Additional EUT information For IC Canada (appendix 2)

IC Registration Number:	8311A-0035000000, 8311A-0027590000, 8311A-0027390000, 8311A-0027670000.
Model Name:	i.roc, RFx11_125 kHz, RFx11_134 kHz, RFx10_13_56 MHz.
Manufacturer (complete Adress):	Ecom engineering GmbH Industriestr. 2 97959 Assamstadt Germany
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7
Open Area Test Site Industry Canada Number:	IC 3462C-1
Frequency Range (or fixed frequency) [MHz]:	2400 – 2483.5 MHz
RF: Power [W] (max):	<u>DSSS:</u> Rad. EIRP: 18.11 mW
Antenna Type:	Integrated antenna
Occupied Bandwidth (99% BW) [kHz]:	DSSS: 15.37 20 dB bandwidth (Refer to test report number: 04U2826-1).
Type of Modulation:	DSSS
Emission Designator (TRC-43):	15M3G1D (DSSS) 20 dB bandwidth (Refer to test report number: 04U2826-1).
Transmitter Spurious (worst case) [dBμV/m]:	47.35
Receiver Spurious (worst case) [dBμV/m]:	29.19

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Meheza K. Walla Date: 2009-11-30

3.1.3 RF Technical Brief Cover Sheet acc. To RSS-102

All Fields must be completed with the requested information or the following codes: N/A for Not Applicable, N/P for Not Performed or N/V for Not Available. Where applicable, check appropriate box.

- 1. COMPANY NUMBER: **8311A**
- 2. MODEL NUMBER: **i.roc, RFx11_125 kHz, RFx11_134 kHz, RFx10_13_56 MHz.**
- 3. MANUFACTURER: **Ecom engineering GmbH**
- 4. TYPE OF EVALUATION: **© RF Evaluation**

- Evaluated against exposure limits: General Public Use Controlled Use
 - Duty cycle used in evaluation: 100 %
 - Standard used for evaluation: RSS-102 Issue 2 (2005-11)
 - Measurement distance: 0.20 m
 - RF value: 0.036 V/m A/m W/m²
- Measured Computed Calculated

Declaration of RF Exposure Compliance

ATTESTATION:

I attest that the information provided in this test report is correct; that a Technical Brief was prepared and the information it contains is correct; that the device evaluation was performed or supervised by me; that applicable measurement methods and evaluation methodologies have been followed and that the device meets the SAR and/or RF exposure limits of RSS-102.

Name: Meheza K. Walla
Title: Dipl.-Ing. (FH)
Company: Cetecom ICT Services GmbH

3.1.4 EUT operating modes

EUT operating mode no. *)	Description of operating modes	Additional information
Op. 0	Normal mode	Normal temperature and power source conditions
Op. 1		low temperature, low power source conditions
Op. 2		low temperature, high power source conditions
Op. 3		high temperature, low power source conditions
Op. 4		high temperature, high power source conditions

*) EUT operating mode no. is used to simplify the test plan

3.1.5 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	23
Nominal Humidity	H _{nom}	%	50
Nominal Power Source	V _{nom}	V	115 V AC

Type of power source: **115 V AC from Power Supply**

Deviations from these values are reported in chapter 2

4 Summary of Measurement Results and list of all performed test cases

- No deviations from the technical specifications were ascertained
- There were deviations from the technical specifications ascertained**

TC identifier	Description	verdict	date	Remark
RF-Testing	FCC Part 15 §15.247 - CANADA RSS-210	PASS	2009-11-30	-/-

Test Specification Clause	Test Case	Pass	Fail	Not applicable	Not performed
§ 15.247 (b)(3)	Max. peak output power (radiated)	Yes			
§15.205	Band-edge compliance of radiated emissions	Yes			
§ 15.209	Spurious Emission -radiated (Transmitter)	Yes			
§ 15.109	Spurious Emissions-radiated (Receiver)	Yes			
§ 15.209	Spurious Emissions-radiated <30 MHz	Yes			
§ 15.107/207	Conducted Emissions <30 MHz	Yes			

5 RF measurement testing

5.1 Description of test set-up

5.1.1 Radiated measurements

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.

The receiving antennas are confirmed with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.

Antennas are confirmed with ANSI C63.2-1996 item 15.

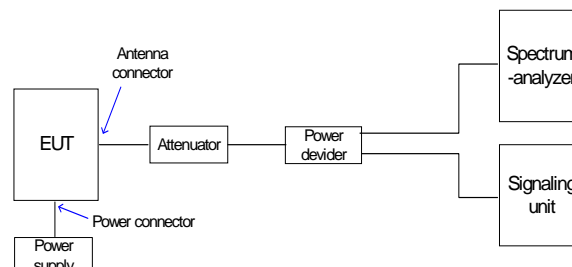
- 9 kHz - 150 MHz: Quasi Peak measurement, 200 Hz Bandwidth, passive loop antenna.
- 150 kHz - 30 MHz: Quasi Peak measurement, 9 kHz Bandwidth, passive loop antenna.
- 30 MHz - 200 MHz: Quasi Peak measurement, 120 kHz Bandwidth, biconical antenna
- 200MHz - 1GHz: Quasi Peak measurement, 120 kHz Bandwidth, log periodic antenna
- >1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

5.1.2 Conducted measurements

Not performed! Only delta measurements radiated

The EUT's RF signal is coupled out by the antenna connector which is supplied by the manufacturer. The signal is connected to the spectrum analyzer. The specific losses for signal path are first checked within a calibration. The measurement readings on the spectrum analyzer are corrected by the specific test set-up loss. The attenuator, power divider, signalling unit and the spectrum analyzer are impedance matched on 50 Ohm.



5.2 Referenced Documents

Pre-certified WLAN-module used. Only delta-measurements performed.
Refer to test report number: 04U2826-1 for the full tests.

5.3 Additional comments

The manufacturer provided 4 test samples with different FCC IDs and IC Nr. 3 of these samples were prepared for the RF testing on specific RFID frequencies (125 kHz, 134 kHz, 13.56 MHz) but remained identical in term of the WLAN configuration.

Therefore only one of the test samples was reused for the WLAN radio testing.

The delta-measurements were performed at a power level identical to the one used in the full test report.

MPE calculation

These equations are generally accurate in the far field of an antenna but will over predict power density in the near field, where they could be used for making a “worst case” prediction.

$$S = PG/4\pi R^2$$

where S = power density (in appropriate units, e.g. mW/cm²)
P = power input to the antenna (in appropriate units e.g. mW)
G = power gain of the antenna in the direction of interest relative to the isotropic radiator
R = distance to the centre of radiation of the antenna (appropriate units e.g. cm)

Or

$$S = \text{EIRP}/4\pi R^2$$

where EIRP = equivalent isotropically radiated power

Calculation:

(Calculated for max. EIRP)

EIRP: 12.58 dBm (18.11 mW)

calculated at distance of 20 cm:

$$\text{power density} = 18.11 / 4\pi 20^2 = 0.0036 \text{ mW/cm}^2$$

Limit:

1mW/cm ² is the reference level for general public exposure according to the OET Bulletin 65, Edition 97-01 Table 1.
--

5.4 Spectrum Bandwidth / 6 dB Bandwidth §15.247(a)(2)

Not performed!

Refer to test report number: 04U2826-1.

5.5 Spectrum Bandwidth / 20 dB Bandwidth §15.247

Not performed!

Refer to test report number: 04U2826-1.

5.6 Max. peak output power (radiated) §15.247 (b)(3)

DSSS: modulated

Results:

Test conditions Frequency [MHz]		Max. peak output power EIRP [dBm]		
		2412	2437	2462
T _{nom}	V _{nom}	12.44	12.35	12.58
Measurement uncertainty		±3dB		

RBW / VBW: 30 MHz

Measured at a distance of 3m

Limits:

Under normal test conditions only, for frequency range 2400-2483.5 MHz	Max. 1.0 Watt
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5.7 Band-edge compliance of conducted emissions §15.247 (d)

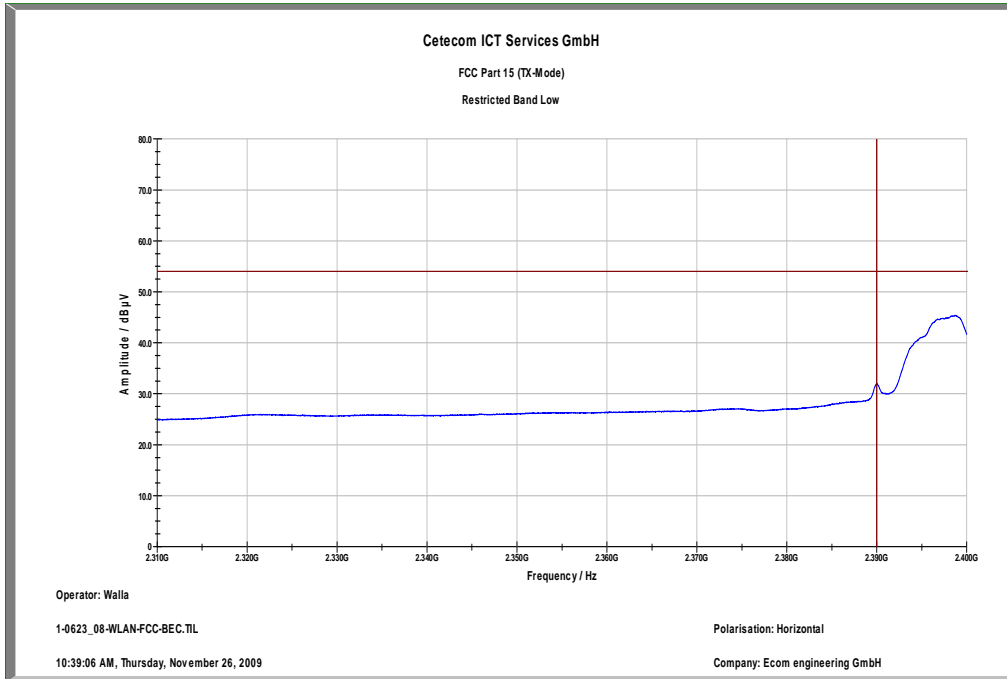
Not performed!

Limits:

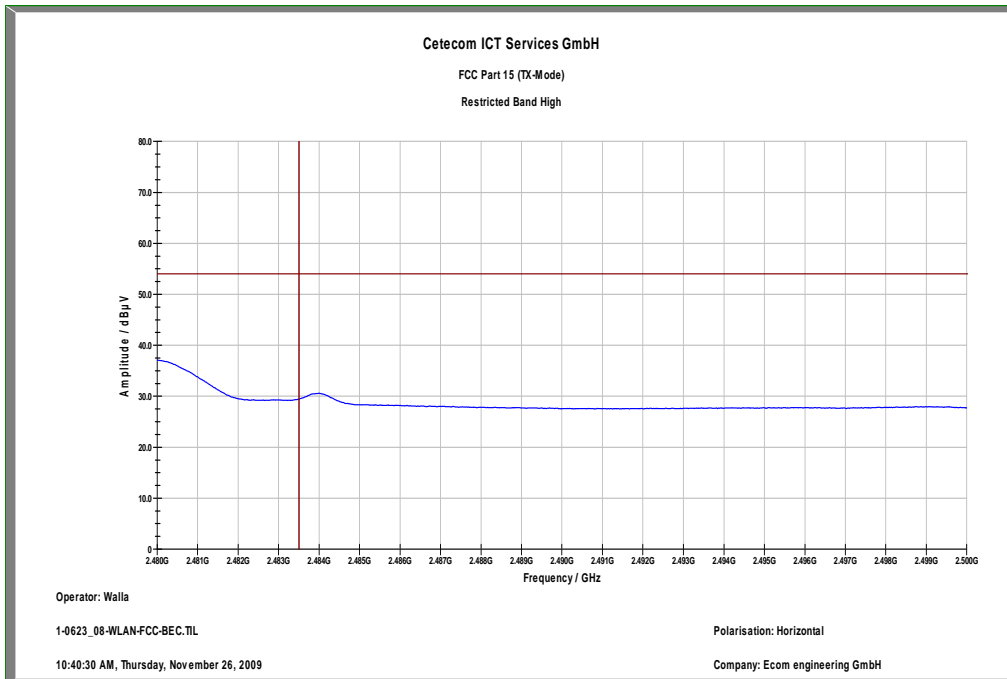
<p>Under normal test conditions only</p>	<p>In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 5.205(c)).</p>
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5.8 Band-edge compliance of radiated emissions §15.205

Plot 1: Restricted Band low



Plot 2: Restricted Band high



Limit: 54 dBµV/m		Complies
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5.9 Spurious Emissions - radiated (Transmitter) §15.209

Plot 1: 0.03 - 1 GHz, antenna vertical/horizontal (lowest channel) @ 10 m

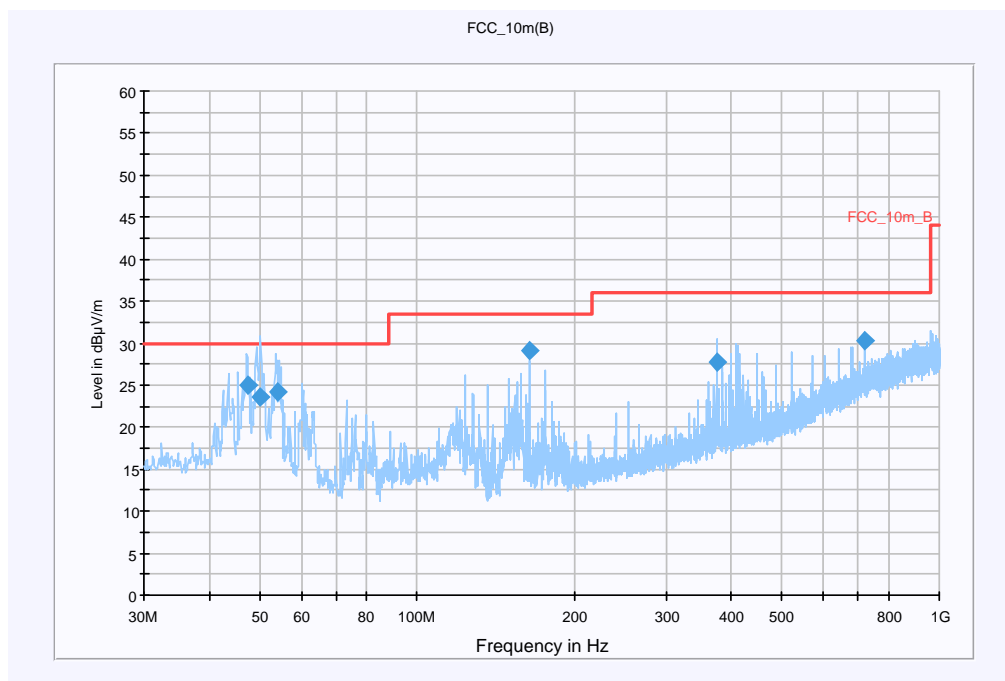
Information

EUT:	i.roc and Delta Electronics AC/DC Adaptor EADP-10BB
Serial Number:	3566-PMMC-0007 and 592A401Z9TV1AK
Test Description:	FCC Part 15 class B @ 10m
Operating Conditions:	WLAN Testmode Channel 01 + Charging
Operator Name:	Kraus
Comment:	Powered by 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

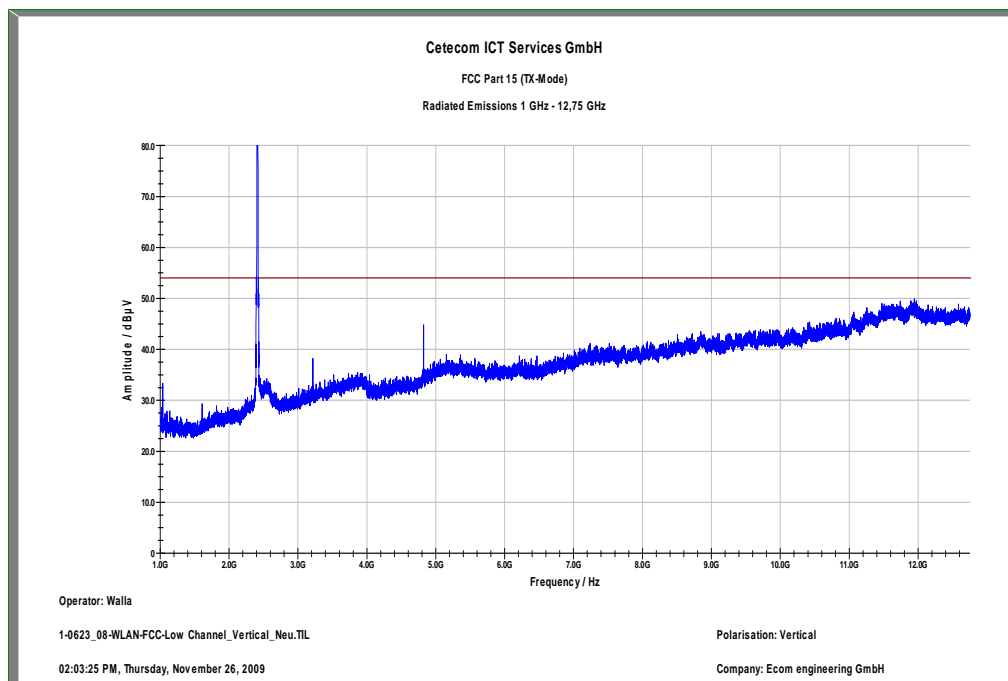


Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
47.360450	25.0	15000.000	120.000	100.0	V	119.0	13.5	5.0	30.0
50.162050	23.6	15000.000	120.000	200.0	V	130.0	13.5	6.4	30.0
53.889150	24.1	15000.000	120.000	200.0	V	76.0	13.2	5.9	30.0
164.005250	29.0	15000.000	120.000	112.0	V	267.0	9.7	4.5	33.5
375.801250	27.8	15000.000	120.000	100.0	V	212.0	16.9	8.2	36.0
721.478600	30.3	15000.000	120.000	131.0	H	279.0	23.5	5.7	36.0

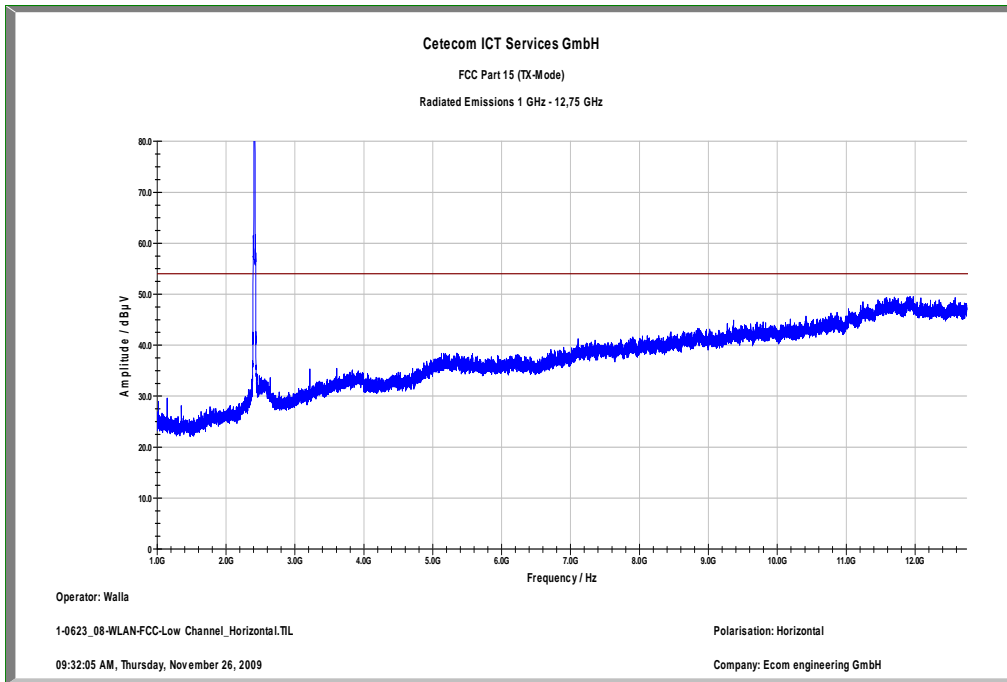
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

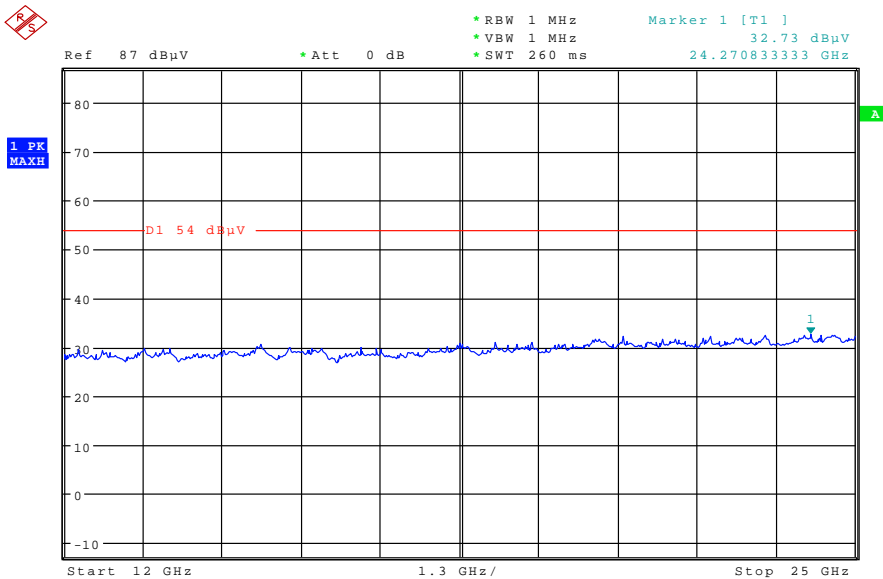
Plot 2: 1 - 12 GHz, antenna vertical (lowest channel) @ 3 m



Plot 3: 1 - 12 GHz, antenna horizontal (lowest channel) @ 3 m



Plot 4: 12- 25 GHz, antenna vertical/horizontal (valid for all channels)



Plot 5: 0.03 - 1 GHz, antenna vertical/horizontal (middle channel) @ 10 m

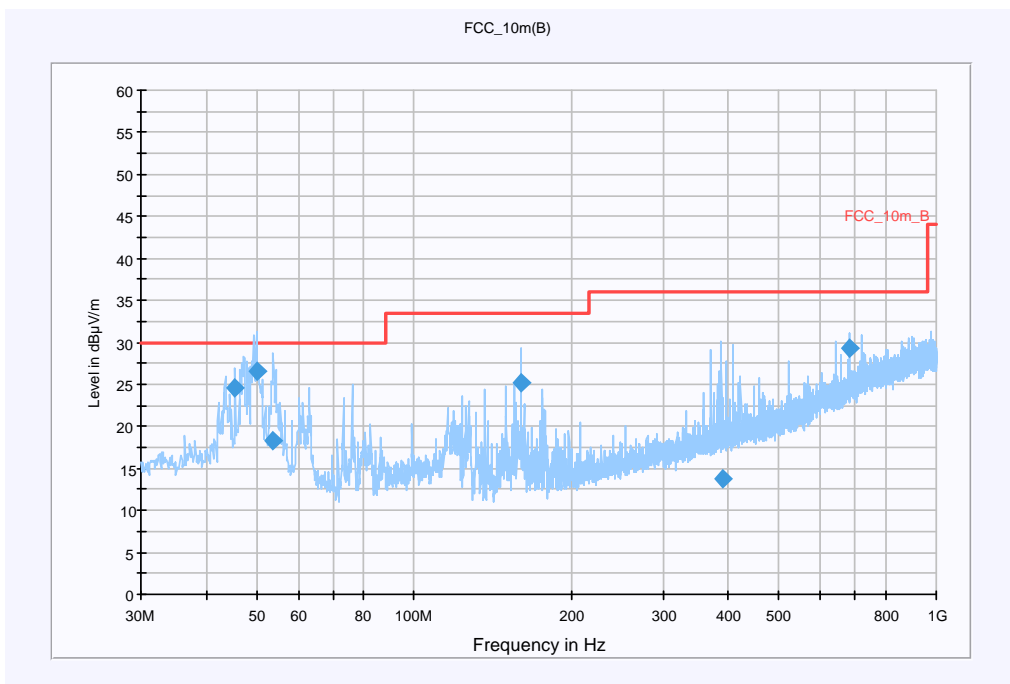
Information

EUT:	i.roc and Delta Electronics AC/DC Adaptor EADP-10BB
Serial Number:	3566-PMMC-0007 and 592A401Z9TV1AK
Test Description:	FCC Part 15 class B @ 10m
Operating Conditions:	WLAN Testmode Channel 06 + Charging
Operator Name:	Kraus
Comment:	Powered by 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

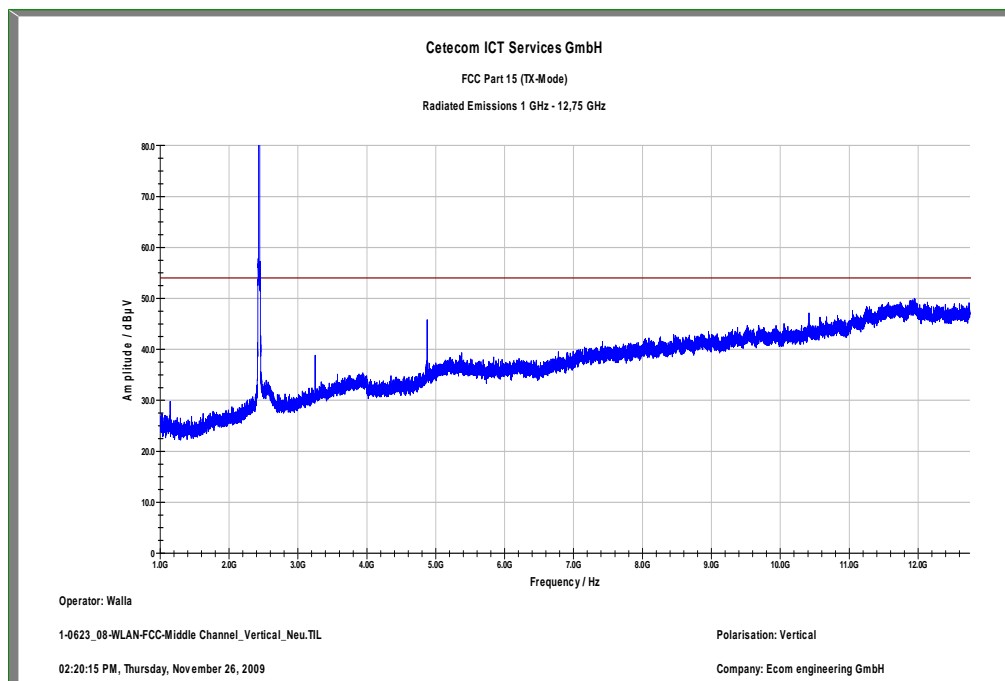


Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
45.485800	24.6	15000.000	120.000	107.0	V	-1.0	13.4	5.4	30.0
50.195400	26.6	15000.000	120.000	100.0	V	50.0	13.5	3.4	30.0
53.856650	18.3	15000.000	120.000	265.0	V	234.0	13.2	11.7	30.0
160.207350	25.1	15000.000	120.000	200.0	V	276.0	9.4	8.4	33.5
388.757150	13.8	15000.000	120.000	137.0	V	199.0	17.1	22.2	36.0
682.463350	29.3	15000.000	120.000	217.0	H	192.0	22.5	6.7	36.0

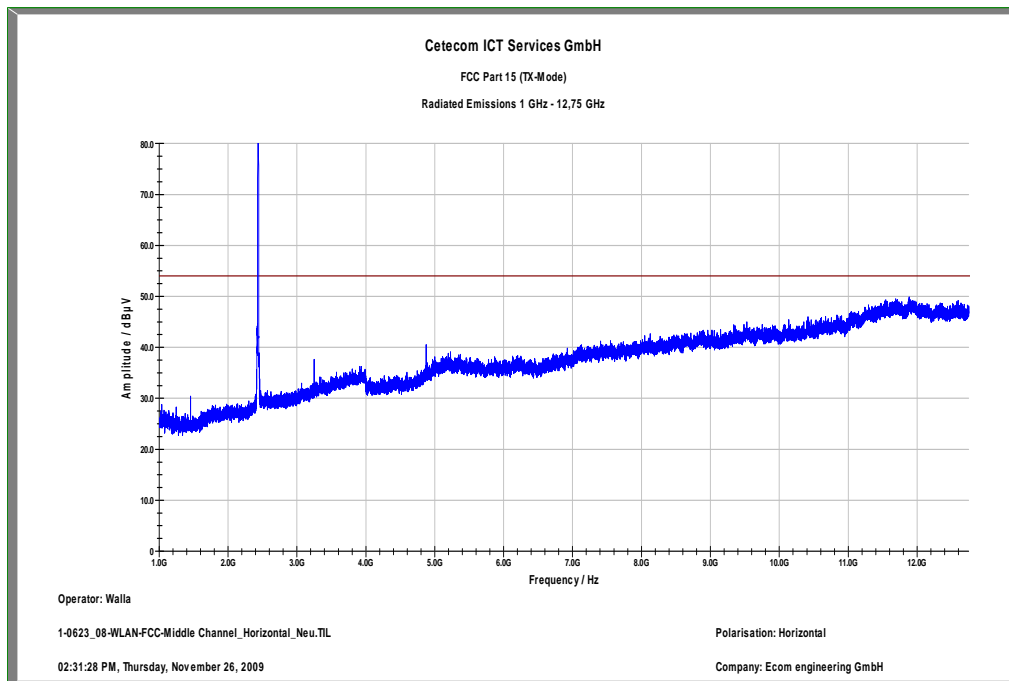
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 6: 1 - 12 GHz, antenna vertical (middle channel) @ 3 m



Plot 7: 1 - 12 GHz, antenna horizontal (middle channel) @ 3m



Plot 8: 0.03 - 1 GHz, antenna vertical/horizontal (highest channel)

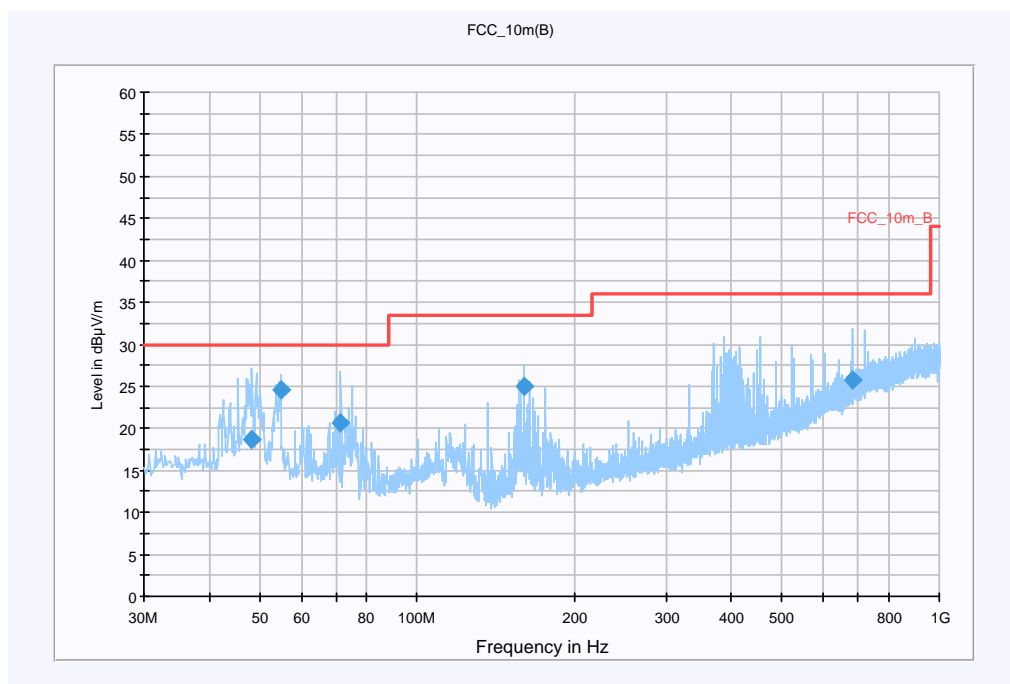
Information

EUT:	i.roc and Delta Electronics AC/DC Adaptor EADP-10BB
Serial Number:	3566-PMMC-0007 and 592A401Z9TV1AK
Test Description:	FCC Part 15 class B @ 10m
Operating Conditions:	WLAN Testmode Channel 11 + Charging
Operator Name:	Kraus
Comment:	Powered by 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dB μ V/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

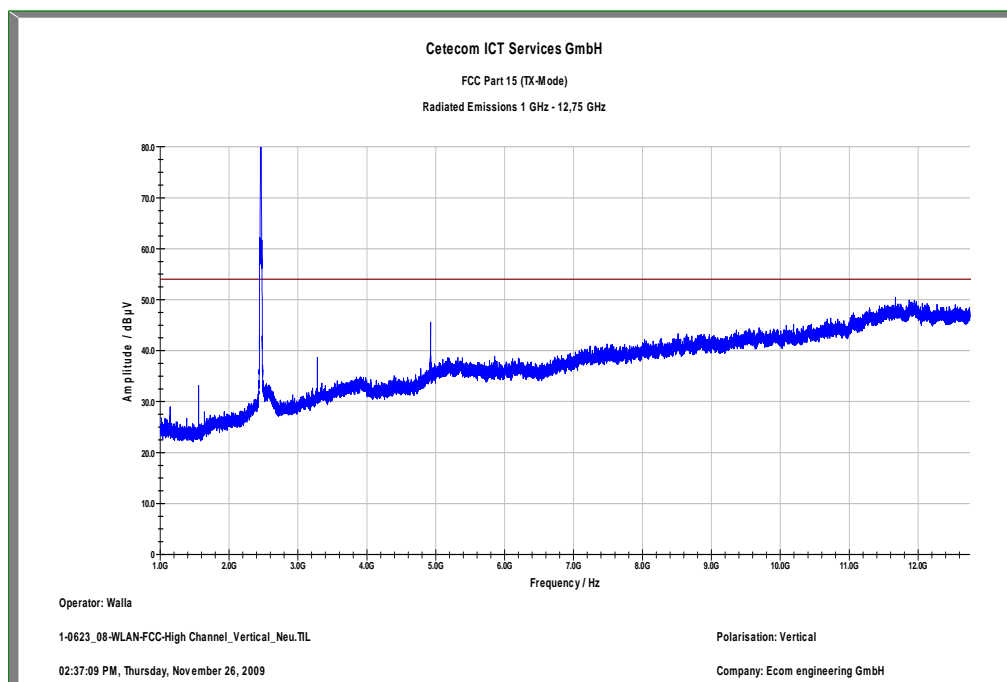


Frequency (MHz)	QuasiPeak (dB μ V/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dB μ V/m)
48.224300	18.6	15000.000	120.000	100.0	V	132.0	13.5	11.4	30.0
54.918500	24.6	15000.000	120.000	332.0	V	135.0	13.1	15.5	30.0
71.508900	20.7	15000.000	120.000	324.0	V	9.0	9.5	9.3	30.0
160.236450	24.9	15000.000	120.000	107.0	V	232.0	9.4	8.6	33.5
682.442200	25.7	15000.000	120.000	188.0	H	182.0	22.5	10.3	36.0

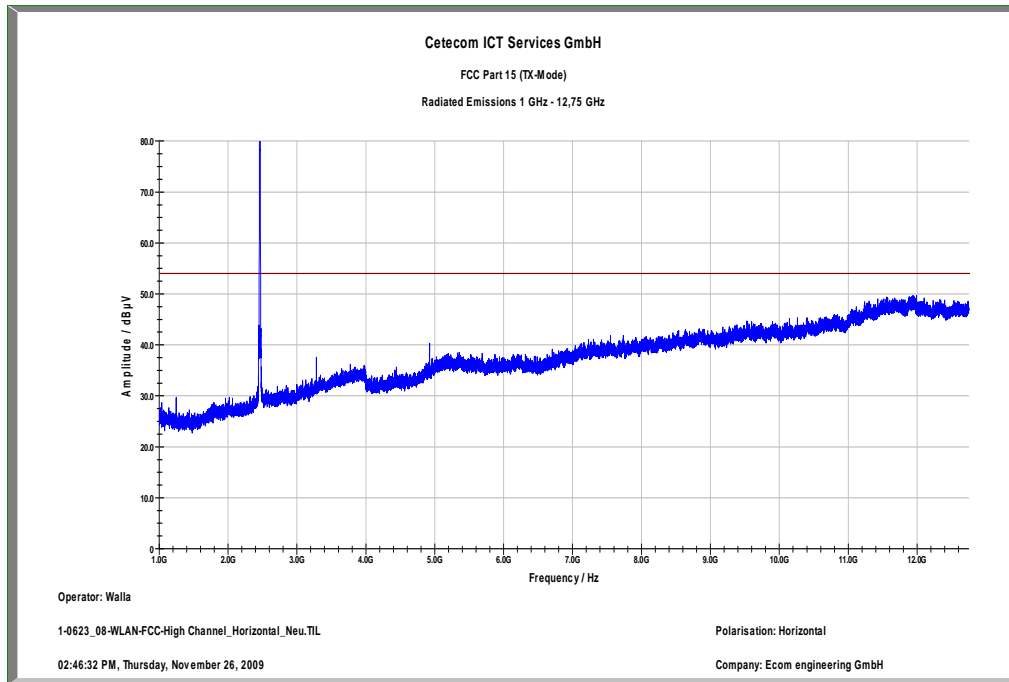
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 9: 1 - 12 GHz, antenna vertical (highest channel)



Plot 10: 1 - 12 GHz, antenna horizontal (highest channel)



Results:

SPURIOUS EMISSIONS LEVEL §15.209								
2412 MHz			2437 MHz			2462 MHz		
Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]	Frequency [MHz]	Detector	Level [dBµV/m]
3216	Peak	46.06	3250	Peak	45.46	3282	Peak	47.35
4824	Average	41.89	4874	Average	42.19	4924	Average	43.22
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Limits:

§ 15.247 (c)

In any 100 kHz bandwidth outside the frequency band at least 20dB below the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Limits:

§ 15.109

Frequency (MHz)	Field strength (dBµV/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.10 Spurious Emissions - radiated (Receiver) §15.109 / 209

Plot 1: 0.03 - 1 GHz, antenna vertical/horizontal (receiver) @ 10m

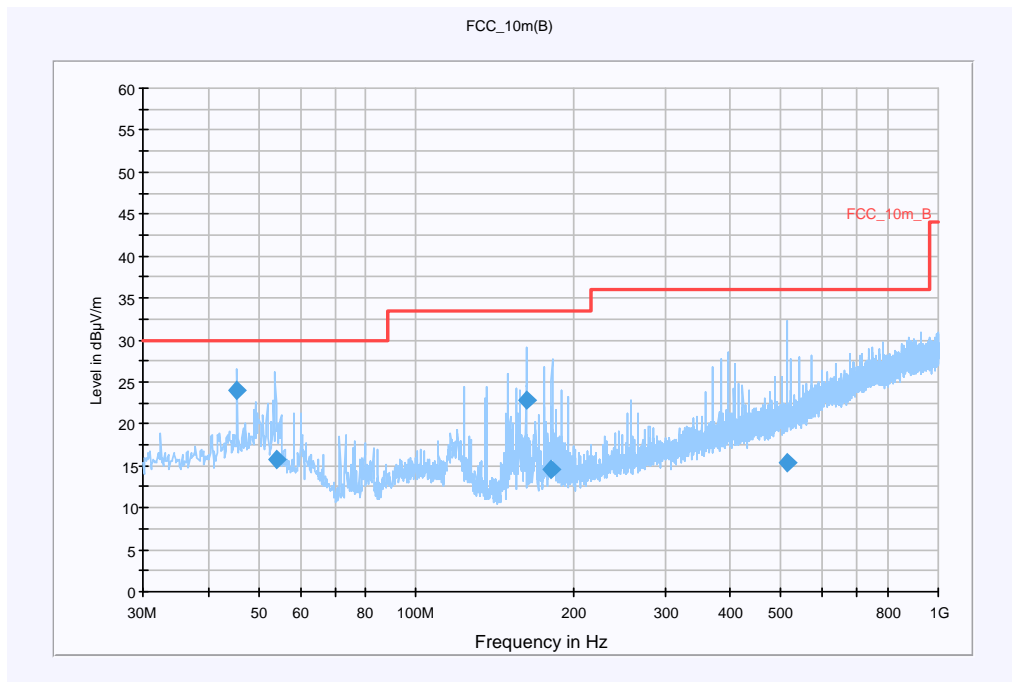
Information

EUT:	i.roc and Delta Electronics AC/DC Adaptor EADP-10BB
Serial Number:	3566-PMMC-0007 and 592A401Z9TV1AK
Test Description:	FCC Part 15 class B @ 10m
Operating Conditions:	Idle + Charging
Operator Name:	Kraus
Comment:	Power 115V / 60Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1 GHz	QuasiPeak	120 kHz	15 s	Receiver

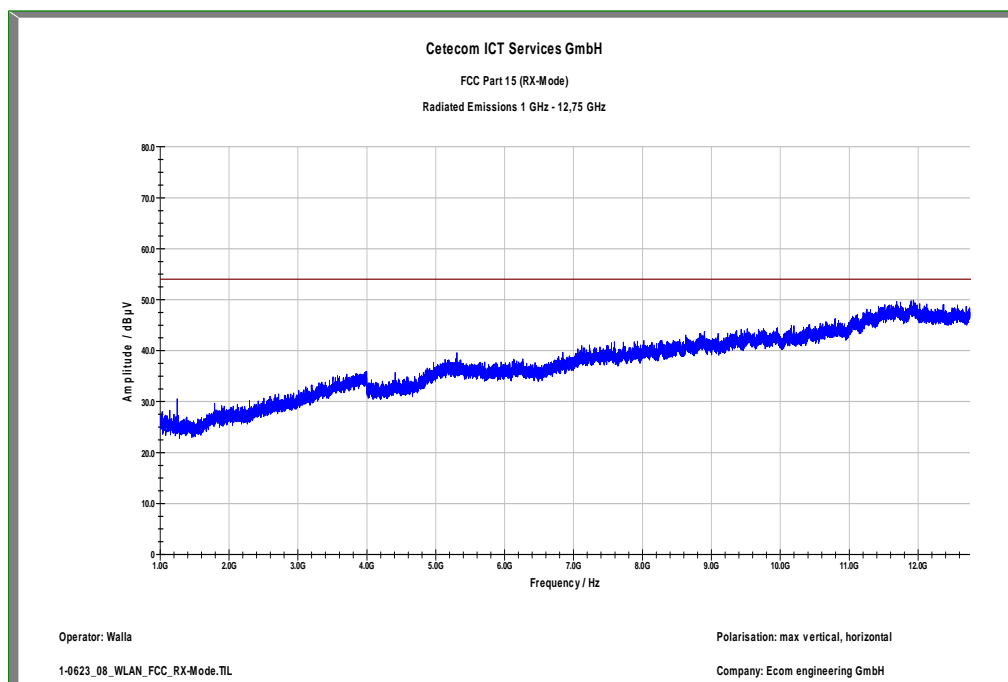


Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)
45.513400	24.1	15000.000	120.000	166.0	V	50.0	13.4	5.9	30.0
53.937200	15.8	15000.000	120.000	200.0	V	226.0	13.2	14.2	30.0
162.492400	22.9	15000.000	120.000	200.0	V	224.0	9.6	10.6	33.5
181.539750	14.6	15000.000	120.000	161.0	V	268.0	10.8	18.9	33.5
514.738050	15.3	15000.000	120.000	200.0	V	83.0	19.3	20.7	36.0

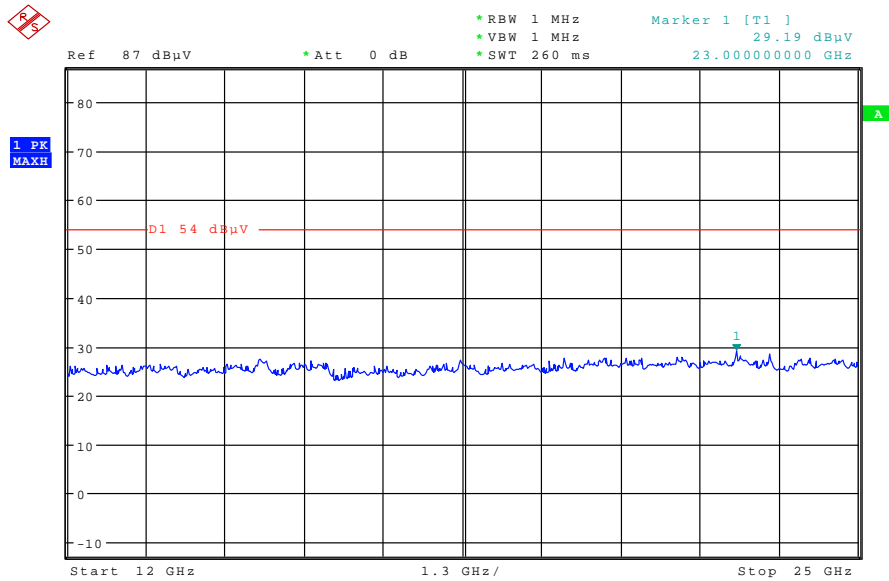
Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32, CAL 07.01.2010
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW ---, CAL 08.04.2010 Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0109)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

Plot 2: 1 - 12 GHz, antenna vertical/horizontal (receiver) @ 3m



Plot 3: 12- 25 GHz (receiver)



Results:

Spurious Emissions level [dBμV/m]		
Frequency [MHz]	Detector	Level [dBμV/m]
No critical peaks detected!		
Measurement uncertainty		±3 dB

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

See above plots

Measurement distance see table

Limits:

§ 15.109

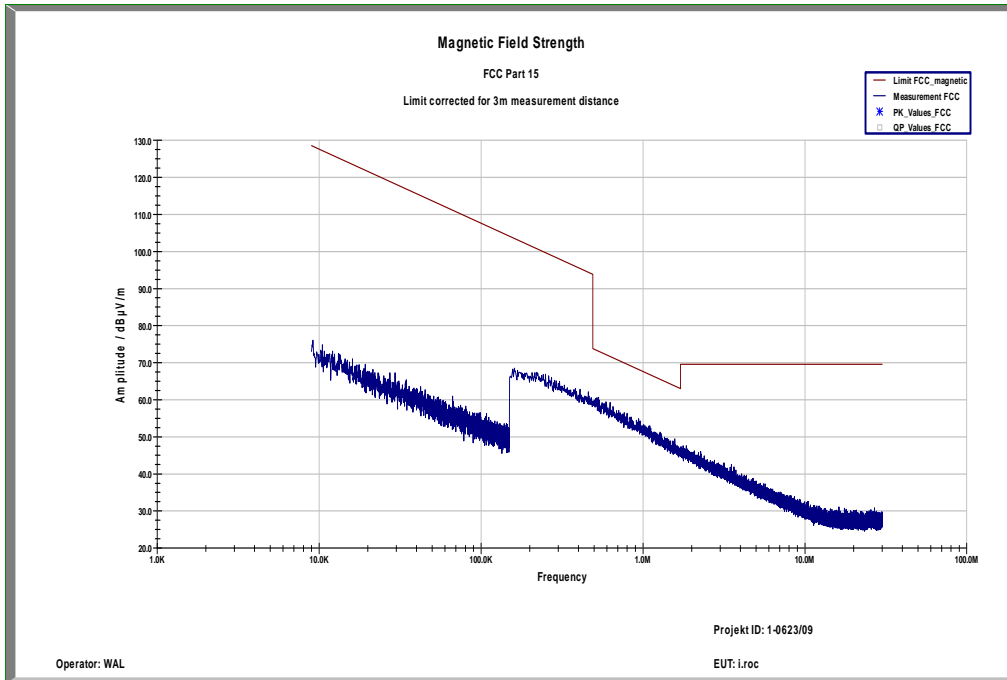
Frequency (MHz)	Field strength (dBμV/m)	Measurement distance (m)
30 - 88	30.0	10
88 - 216	33.5	10
216 - 960	36.0	10
above 960	54.0	3

5.11 Spurious Emissions - radiated <30 MHz §15.209

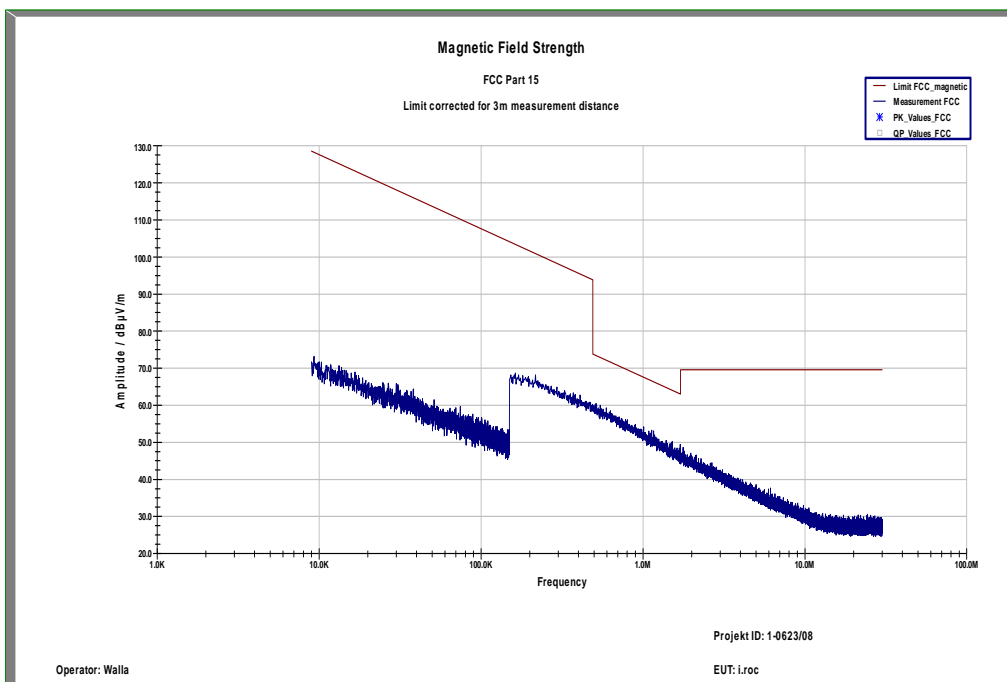
Measured at 3 m distance.

Values recalculated with 40 dB/decade according to FCC rules.

Plot 1: TX – Mode



Plot 2: RX – Mode

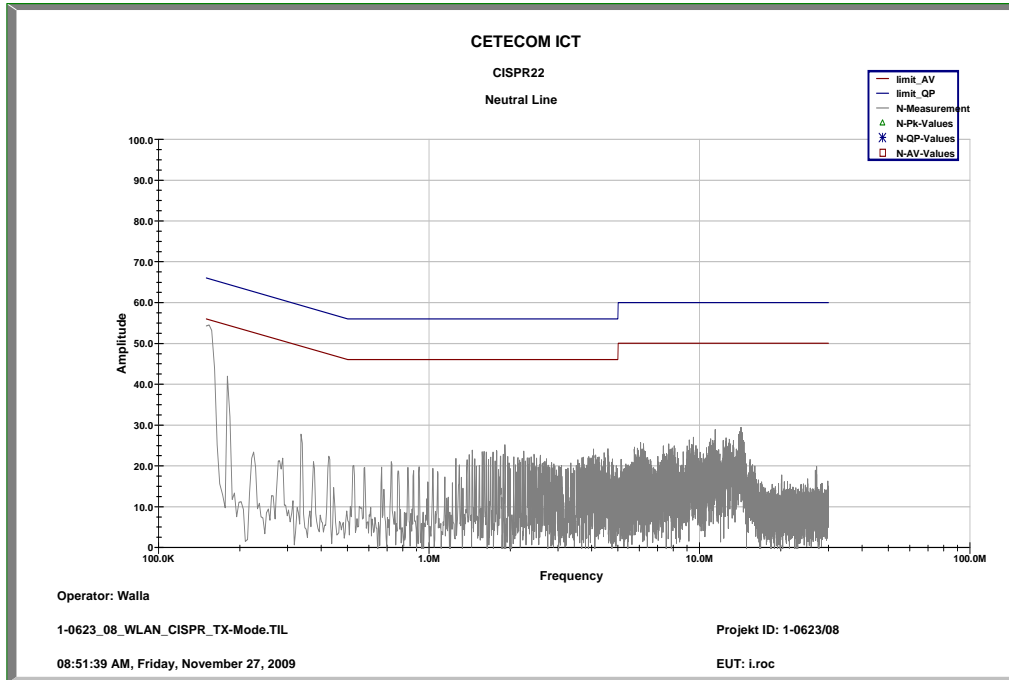


Limits:

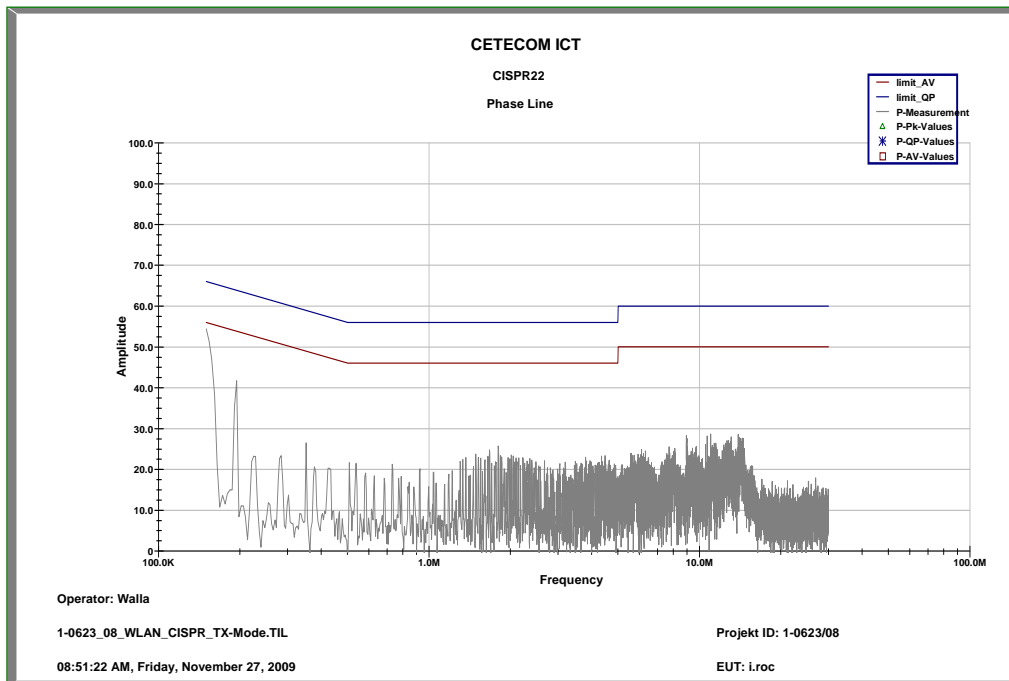
Frequency (MHz)	Field strength ($\mu\text{V/m}$)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30 / 29.5 dB $\mu\text{V/m}$	30
30 - 88	100 / 40 dB $\mu\text{V/m}$	3
88 - 216	150 / 43.5 dB $\mu\text{V/m}$	3
216 - 960	200 / 46 dB $\mu\text{V/m}$	3
above 960	54 dB $\mu\text{V/m}$	3

5.12 Conducted Emissions <30 MHz §15.107/207

Plot 1: TX – Mode, Neutral line



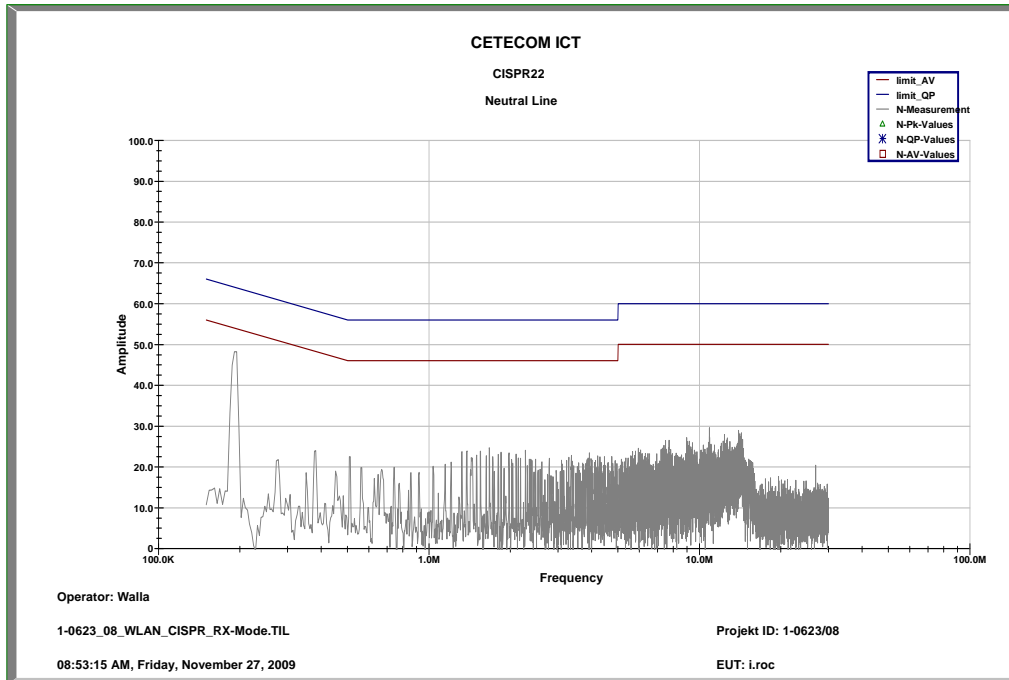
Plot 2: TX – Mode, Phase line



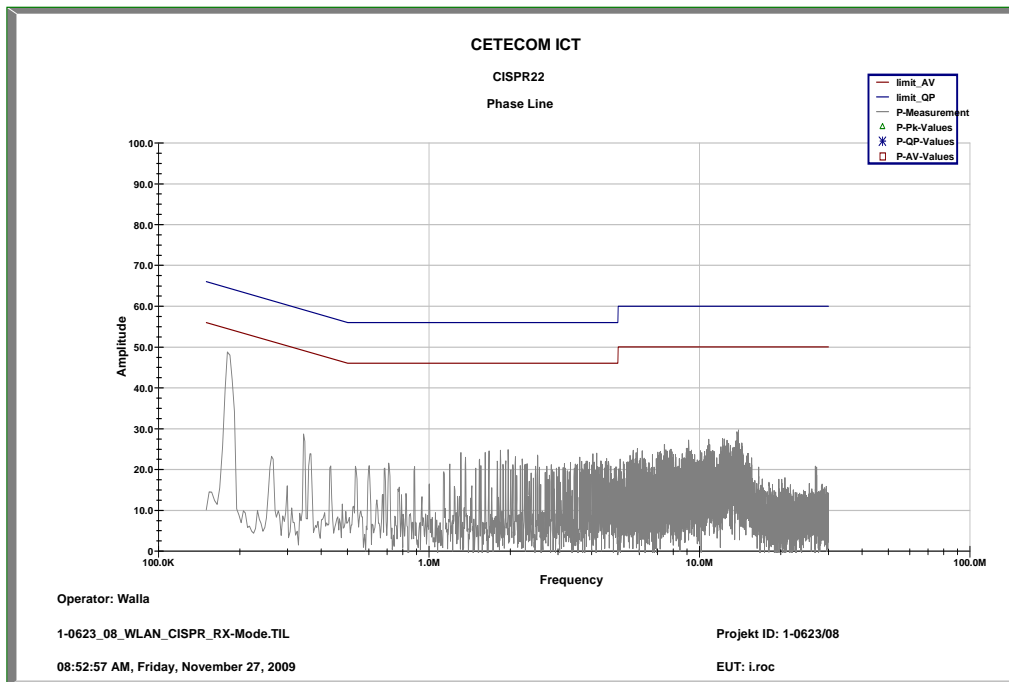
Limits:

Under normal test conditions only	See plots
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Plot 3: RX – Mode, Neutral line



Plot 4: RX – Mode, Phase line



Limits:

Under normal test conditions only	See plots
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6 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	PSA-Spektrumanalysator 3 Hz - 26.5 GHz (E4440A)	Agilent	MY48250080	300003812	05.08.2008	24	05.08.2010
5	EMI Preselector 9 kHz - 1 GHz (N9039A)	Agilent	MY48260003	300003825	19.08.2008	24	19.08.2010
6	Microwave Analog Signal Generator (N5183A)	Agilent	MY47420220	300003813	06.08.2008	24	06.08.2010
7	PC	F+W			n.a.		
8	TILE	TILE			n.a.		
9	TRILOG Super Broadband Antenna (VULB9163)	Schwarzbeck	371	300003854	Monthly verification (System cal.)		
10	Double Ridged Antenna 3115	EMCO	3088	300001032	Monthly verification (System cal.)		
11	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
12	Switch / Control Unit 3488A	HP	2719A15013	300001156	n.a.		
13	Power Supply 6032A	HP	2818A03450	300001040	08.01.2009	36	08.01.2012
14	Busisolator	Kontron		300001056	n.a.		
15	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
16	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
17	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
18	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		
19	Hochpassfilter WHK1.1/15G-10SS	Wainwright	3	300003255	Monthly verification (System cal.)		
20	Hochpassfilter WHKX2.9/18G-12SS	Wainwright	1	300003492	Monthly verification (System cal.)		
21	Hochpassfilter WHKX7.0/18G-8SS	Wainwright	18	300003789	Monthly verification (System cal.)		
22	Switch / Control Unit 3488A	HP	2605e08770	300001443	n.a.		
23	Trenntrafo RT5A	Grundig	9242	300001263	n.a.		
24	Relais Matrix PSU	R&S	890167/024	300001168	n.a.		
25	Netznachbildung ESH3-Z5	R&S	828576/020	300001210	n.a.		

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19" Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	10.01.2008	24	10.01.2010
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	26.08.2008	36	26.08.2011
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
15	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	25.08.2008	36	25.08.2011
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
18	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
20	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
21	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	26.08.2008	36	26.08.2011
23	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
25	Power Meter NRVD	R&S	835430/044	3000002681-0004	26.08.2008	24	26.08.2010
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	26.08.2008	24	26.08.2010
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	26.08.2008	24	26.08.2010
28	Rubidium Standard RUB	R&S		3000002681-0009	27.08.2008	24	27.08.2010
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	27.08.2008	24	27.08.2010
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
31	19" Rack	R&S	11138363000004	3000002681	n.a.		
32	RF-cable set	R&S	N/A	3000002681	n.a.		
33	IEEE-cables	R&S	N/A	3000002681	n.a.		
34	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		
35	RSP programmable attenuator	R&S	834500/010	3000002681-0007	26.08.2008	24	26.08.2010
36	Signalling Unit	R&S	838312/011	3000002681	n.a.		
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
39	Power Splitter 6005-3	Inmet Corp.	none	300002841	26.08.2008	24	26.08.2010
40	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
41	CBT32 with EDR Signaling Unit	R&S					
42	Coupling unit	Narda	N/A	--	n.a.		
43	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
44	RF-cable set	R&S	N/A	different	n.a.		
45	IEEE-cables	R&S	N/A	--	n.a.		

Note: 3000002681-00xx inventoried as a system

Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna	9163-295	-/-	-/-	30.04.2008	24	30.04.2010
3	Amplifier - 0518C-138	Veritech Micro- wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	31.01.2009	24	31.01.2011
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

7 Photographs of the Test Set-up

Photo documentation

Photo 1:

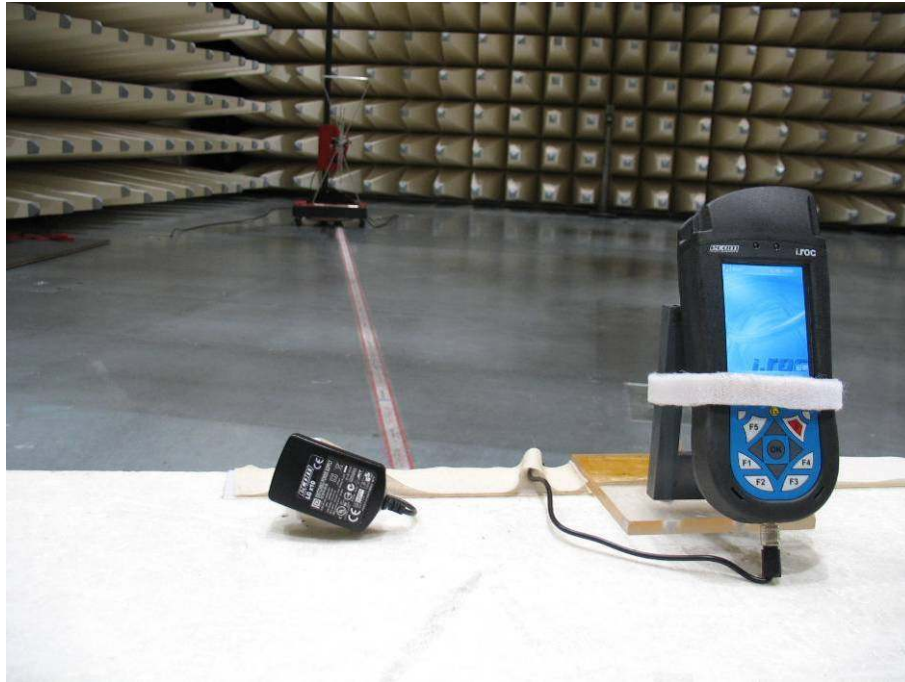


Photo 2:

